

REMARKS

This Amendment is submitted in response to the Final Office Action mailed on March 17, 2008. Claims 1-15, 17-25 and 29-33 were pending in this application. With this Amendment, the currently amended claims are claims 1, 4-6, 12-14, 17-20, 24, 29 and 33. The cancelled claims are claims 2, 3, 7, 8, 10, 11, 15, 16, 25-28 and 30-32. Thus, the currently pending claims before the Examiner for consideration are claims 1, 4-6, 9, 12-14, 17-24, 29 and 33. On page 3 of the Office Action, claims 17-19 were objected to because they were dependent upon a cancelled claim. Claims 17-19 are hereby amended to depend from independent claim 1. Therefore, claims 17-19 are hereby corrected as required, and withdrawal of their objection is respectfully requested.

Examiner Interview Summary

On June 26, 2008, Mai-Tram D. Lauer conducted a telephonic interview with Examiner Shah. Independent claim 1 was discussed. No agreement was reached regarding patentability of the claims. While Examiner Shah stated that the amendments presented herein overcome the primary reference, Hon et al., he stated that he would need to reconsider the Chen et al. reference and perform a new search.

Moreover, Examiner Shah suggested that the Applicant remove the term "adapted to" from the claims. Claims 1 and 20 have been accordingly amended.

Response to Rejections

On page 4 of the Office Action, claims 1-4, 7-12, 15, 17 and 29-32 were rejected under 35 USC § 103(a) as being unpatentable over Hon et al., U.S. Patent No. 5,680,510 in view of Chen et al., U.S. Patent No. 5,751,905

and further in view of Huang et al., entitled "Whistler: A Trainable Text-To-Speech System."

Independent claim 1 has been amended to incorporate the subject matter of now-cancelled claim 3 and to particularly recite that a syllable is modeled by an initial part including a glide and a final part, "wherein the final part comprises a first portion corresponding to a first relative pitch and a second portion corresponding to a second relative pitch, wherein the first portion and the second portion jointly and implicitly carry tonal information." Independent claim 29 similarly recites that "the final part comprises a first phone corresponding to a first relative pitch and a second phone corresponding to a second relative pitch, wherein the first and second phones jointly and implicitly carry tonal information."

Support for these amendments can be found in the original specification at least at, for example, pages 20-23. At least these discussed limitations are not rendered obvious by the combination of references. An exemplary embodiment of this limitation is described in the original specification at page 21, line 20 through page 22, line 8:

Associated with each of V1 and V2 is tonal information. As is known in Mandarin Chinese, there exists five different tones, four of which are illustrated in FIG. 5. The fifth tone is a neutralization mode of the other four. In the embodiment described herein, the different tone types are described by the combination of three categorical pitch levels according to

their relative pitch region, herein illustrated as high (H), medium (M) and low (L), i.e. the tone types illustrated in FIG. 5 can be classified in categorical levels as high-high (HH) for tone 1, low-high (LH) or middle-high (MH) for tone 2, low-low (LL) for tone 3 and high-low (HL) for tone 4. Tone 5, the neutral tone, can either share the pattern of tone 4 or tone 3 according to the previous tone types, or be modeled separately as medium-medium (MM). The first mark in the tone pattern is attached to V1 and the second part is attached to V2.

Moreover, "instead of modeling tone types directly, tones are realized implicitly and jointly by a plurality of parts, e.g. two parts or segments (herein also called "segmental toneme"), which both carry tonal information." (page 21, lines 15-19).

None of the references teaches this "segmental toneme" modeling construction, and therefore even in combination, the references do not render obvious these limitations of independent claims 1 and 29. In Hon, as shown in Figure 3 and discussed at column 6, lines 53-63, a syllable field 51 for a two-toned example language includes an initial field 50, a final field 52, and a tone field 114.  $T_1$  and  $T_2$  are represented by two bits that together make up the tone field 114. "Tone field 114 indicates that the syllable /bat/ may have  $T_1$  or  $T_2$  as a tone." (column 6, lines 61-63) (emphasis added). Thus, only one of  $T_1$  or  $T_2$

describes the tone of the syllable. There is no teaching of a model in which a final part comprises a plurality of portions that jointly carry tone information.

Moreover, in Hon, the tone field 114 is a third component of syllable field 51, in addition to initial field 50 and final field 52. Thus, no tonal information is contained in final field 52. Moreover, tone field 114 overlies both initial field 50 and final field 52 (see FIG. 3) and therefore cannot be considered a final field itself. This is fundamentally different from the claimed final part, which comprises "a first portion corresponding to a first relative pitch and a second portion corresponding to a second relative pitch, wherein the first portion and the second portion jointly and implicitly carry tonal information."

Chen also does not disclose a final part as claimed. While Chen recognizes that the second part of a syllable can contain one or two single phones, it does not teach a modeling system based on that disclosure. (col. 4, lines 13-14). Rather, Chen teaches that "there are three possibilities for the content of the second part of the syllable:" a single vowel, a diphthong, and a single vowel with a nasal ending. (col. 4, lines 15-20). "[i]n each of the above three cases for Mandarin Chinese, the second part of a syllable can be treated as a single phoneme." (col. 4, lines 25-27).

Thus, for any one of the vowel phonemes, there are five possible toned phonemes. For example, the phoneme "a" has five toned phonemes, a1, a2, a3, a4, and a5, representing a vowel "a" with high, rising, low, falling, and

untuned versions, respectively. A vowel phoneme with tone is referred to herein as a "toneme" to emphasize its tone content. (Col. 4, lines 31-37).

Thus, Chen's toneme is categorized into one of five versions, namely high, rising, low, falling, and untuned. The present application refers to this as "modeling tone types directly" and distinguishes this approach from the claimed approach (page 21, line 16). The "segmental toneme" final part of a modeled syllable of the present invention, as claimed in independent claim 1, comprises a first portion and a second portion. In an illustrative example, described at pages 21-23 of the original application, the final part includes first portion V1 and second portion V2. The first mark in a toned pattern is attached to V1 and the second mark is attached to V2. (page 22, line 6-8). In a language with three categorical pitch levels according to their relative pitch region, a relative high pitch is denoted by H, a relative middle pitch is denoted by M, and a relative low pitch is denoted by L. In an exemplary embodiment, tone 1 has a final part denoted by notation HH. Tone 2 is denoted by LH or MH. Tone 3 is denoted by LL. Tone 4 is denoted by HL. Tone 5 is denoted by LL or MM.

Thus, in the claimed model, the final part of a syllable includes a first portion corresponding to a first relative pitch and a second portion corresponding to a second relative pitch of the syllable. A segmental toneme of the present invention is easily extended to languages that have fewer or more pitch levels, as described at page 27, lines 15-27, for example:

For example, under the basic idea of representing the typical tone types with segmental toneme, this concept can easily extend the current 2-value (High/Low) quantization on pitch level into more detailed levels, such as 3-value (as High/Middle/Low) or even 5-value (like 1~5) to depict the pattern of the typical tone types in details, if desired. If five values are used for Mandarin Chinese tones, the following representation could be used: 5-5 for tone 1, 3-5 or 2-5 for tone 2, 2-1 for tone 3 and 5-1, 5-2 or 4-1 for tone 4. However, it should be more meaningful for tonal languages with more tone types, such as Cantonese, which has about nine tone types.

The claimed segmental toneme having a first portion corresponding to a first relative pitch and a second portion corresponding to a second relative pitch is thus very different from a toneme of Chen, which is constrained to a direct representation of one of five tone types.

Huang does not add any disclosure that, in combination with Hon and Chen, would render obvious the segmental toneme limitation of independent claims 1 or 29. Thus, the applicant respectfully submits that independent claim 1 and its dependent claims 4, 9, 12 and 17 and independent claim 29 are patentable in view of the combination of Hon, Chen and Huang.

On page 8 of the Office Action, claims 5 and 13

were rejected under 35 USC § 103(a) as being unpatentable over Hon in view of Chen, in view of Huang, and further in view of Akinlabi et al., entitled "The Tonal Phonology of Yoruba Clitics." Claims 5 and 13 each depend from independent claim 1, discussed above with respect to Hon, Chen and Huang. Akinlabi does not add any disclosure that, combined with the previous references, would render obvious the claimed system using syllable modeling with a segmental toneme final part, as claimed. Accordingly, independent claim 1 and its dependent claims 5 and 13 are not rendered obvious by the combination of Hon, Chen, Huang and Akinlabi.

On page 8 of the Office Action, claims 6, 14, 18, 19 and 33 were rejected under 35 USC § 103(a) as being unpatentable over Hon in view of Chen, in view of Huang, and further in view of Chen 2, entitled "Recognize Tone Languages Using Pitch Information on the Main Vowel of Each Syllable." Each of these claims depends from either independent claim 1 or independent claim 29, discussed above with reference to the combination of Hon, Chen and Huang. Like Chen, Chen 2 teaches that tones are categorized according to a toneme type describing the pitch contour. There is no teaching of segmenting the toneme into first or second portions or phones corresponding to first and second relative pitches, as claimed. Because the references in combination do not render obvious each claim limitation, independent claims 1 and 29 and their dependent claims 6, 14, 18, 19 and 33 are allowable under 35 USC § 103(a).

On page 10 of the Office Action, claims 20, 21, 24 and 25 were rejected under 35 USC § 103(a) as being unpatentable over Hon in view of Huang and in view of Chen.

Independent claim 20 has been amended to include a segmental toneme limitation: "wherein the final part comprises a first phone corresponding to a first relative pitch and a second phone corresponding to a second relative pitch". This limitation has been discussed above with reference to the combination of Hon, Huang and Chen. Because the combination of references does not render obvious this limitation, independent claim 20 and its dependent claims 21 and 24 are patentable under 35 USC § 103(a).

On page 12 of the Office Action, claim 22 was rejected under 35 USC § 103(a) as being unpatentable over Hon in view of Huang and in view of Chen, and further in view of Akinlabi. Claim 22 depends from claim 20, which has been discussed with respect to the combination of Hon, Huang, and Chen. Akinlabi does not add any disclosure that would render obvious the segmental toneme limitation. In view thereof, the Applicant respectfully submits that claim 22 is patentable under 35 USC § 103(a) in view of this combination of references.

On page 13 of the Office Action, claim 23 was rejected under 35 USC § 103(a) as being unpatentable over Hon in view of Huang and in view of Chen, and further in view of Chen 2. The segmental toneme limitation has been discussed with respect to each of the these references. Even in combination, the references do not render obvious that limitation. Accordingly, Applicant respectfully submits that claim 23 is patentable over the combination of references under 35 USC § 103(a).

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or



variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences, which applicant's attorney chooses to mention at this time. For the foregoing reasons, applicant reserves the right to submit additional evidence showing the distinction between applicant's invention to be unobvious in view of the prior art.

Furthermore, in commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the same and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims.

An extension of time for consideration of this response is respectfully requested. An online charge authorization for the extension of time fee is included herewith.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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